

## CLAIMS

What is claimed is:

- 1 1. A line card in a network element comprising:  
2 a deframer unit to receive a Time Division Multiplexing (TDM) signal, the  
3 TDM signal including a payload and overhead data, the deframer to generate frame  
4 alignment data based on the overhead data;  
5 a packet engine unit coupled to the deframer unit, the packet engine unit to  
6 receive the payload, the overhead data and the frame alignment data and to generate a  
7 number of packet engine packets, the packet engine packets representing a frame  
8 within the TDM signal such that the packet engine packets include the payload and  
9 the frame alignment data; and  
10 a packet processor coupled to the deframer unit, the packet processor to  
11 receive the packet engine packets and to generate network packets based on the  
12 packet engine packets.
- 1 2. The line card of claim 1, wherein the packet engine packets include the  
2 payload, the overhead data and the frame alignment data.
- 1 3. The line card of claim 1, wherein the TDM signal includes a Digital Signal  
2 (DS)-1 signal.
- 1 4. The line card of claim 1, wherein the TDM signal includes a Digital Signal  
2 (DS) – 3 signal.
- 1 5. The line card of claim 1, wherein the TDM signal includes an E1 signal.
- 1 6. The line card of claim 5, wherein the packet processor compresses the DS0  
2 signals.

1 7. The line card of claim 1, wherein the packet processor separates Digital Signal  
2 (DS) – 0 signals from within the TDM signal.

1 8. A network element comprising:  
2 a number of line cards, each of the number of line cards including:  
3 a deframer unit to receive a Time Division Multiplexing (TDM) signal,  
4 the TDM signal including a payload and overhead data, the deframer to generate  
5 frame alignment data based on the overhead data;  
6 a packet engine unit coupled to the deframer unit, the packet engine  
7 unit to receive the payload, the overhead data and the frame alignment data and to  
8 generate a number of packet engine packets, the packet engine packets representing a  
9 frame within the TDM signal such that the packet engine packets includes the  
10 payload, the overhead data and the frame alignment data; and  
11 a packet processor coupled to the deframer unit, the packet processor  
12 to receive the packet engine packets and to generate network packets based on the  
13 packet engine packets; and  
14 at least one control card coupled to the number of line cards.

1 9. The network element of claim 8, wherein the TDM signal includes a Digital  
2 Signal (DS)-1 signal.

1 10. The network element of claim 8, wherein the TDM signal includes a Digital  
2 Signal (DS) – 3 signal.

1 11. The network element of claim 8, wherein the TDM signal includes a J1 signal.

1 12. The network element of claim 8, wherein the packet processor separates a  
2 number of Digital Signal (DS) – 0 signals from within the TDM signal.

1 13. The network element of claim 12, wherein the packet processor for each of the  
2 line cards forwards the number of DS0 signals out to any of the number of line cards  
3 based on forwarding tables, wherein any of the number of DS0 signals from any of  
4 the number of line cards can be combined to form a DS1 signal.

1 14. The network element of claim 13, wherein the DS1 signal is transmitted out  
2 from the line cards.

1 15. The network element of claim 12, wherein the packet processor compresses  
2 the DS0 signals.

1 16. A method comprising:  
2 receiving a TDM signal that includes overhead data and payload data;  
3 generating frame alignment data based on locations of frame boundaries  
4 within the TDM signal;  
5 placing the TDM signal into packet engine packets based on the frame  
6 boundaries within the TDM signal, wherein the overhead data, the payload data and  
7 the frame alignment data are within packet engine packets, such that each packet  
8 engine packet corresponds to a frame within the TDM signal; and  
9 encapsulating the packet engine packets into network packets.

1 17. The method of claim 16, wherein the TDM signal includes a Digital Signal  
2 (DS) - 1 superframe signal, such that each packet engine packet includes a DS1 frame  
3 of the DS1 superframe signal.

1 18. The method of claim 16, wherein the TDM signal includes a Digital Signal  
2 (DS) - 1 extended superframe signal, such that each packet engine packet includes a  
3 DS1 frame of the DS1 extended superframe signal.

1 19. The method of claim 16, wherein the TDM signal includes a Digital Signal  
2 (DS) – 3 signal, such that each packet engine packet includes a subframe of the DS3  
3 signal.

1 20. The method of claim 16, wherein the network packets include Internet  
2 Protocol packets.

1 21. A method comprising:

2 receiving a first Time Division Multiplexing (TDM) signal that includes  
3 overhead data and payload data;  
4 determining frame boundaries within the first TDM signal;  
5 placing the first TDM signal into first packet engine packets based on the  
6 frame boundaries within the first TDM signal;  
7 receiving a second TDM signal;  
8 placing the second TDM signal into second packet engine packets,  
9 independent of frame boundaries within the second TDM signal; and  
10 generating network packets from the first and second packet engine packets  
11 using a same packet processor.

1 22. The method of claim 21, wherein determining the frame boundaries with the  
2 first TDM signal includes generating frame alignment data for the first TDM signal.

1 23. The method of claim 22, wherein placing the first TDM signal into first packet  
2 engine packets includes placing the overhead data, the frame alignment data and the  
3 payload data into the first packet engine packets.

1 24. The method of claim 21, wherein the first and second TDM signals include a  
2 Digital Signal (DS) – 3 signal.

1 25. The method of claim 21, wherein the first and second TDM signals include a  
2 Digital Signal (DS) – 1 signal.

1 26. The method of claim 21, wherein the TDM signal includes an E3 signal.

1 27. A machine-readable medium that provides instructions, which when executed  
2 by a machine, cause said machine to perform operations comprising:

3 receiving a TDM signal that includes overhead data and payload data;

4 generating frame alignment data based on locations of frame boundaries  
5 within the TDM signal;

6 placing the TDM signal into packet engine packets based on the frame  
7 boundaries within the TDM signal, wherein the overhead data, the payload data and  
8 the frame alignment data into packet engine packets, such that packet engine packet  
9 corresponds to a frame within the TDM signal; and

10 encapsulating the packet engine packets into network packets.

1 28. The machine-readable medium of claim 27, wherein the TDM signal includes  
2 a Digital Signal (DS) – 1 superframe signal, such that each packet engine packet  
3 includes a DS1 frame of the DS1 superframe signal.

1 29. The machine-readable medium of claim 27, wherein the TDM signal includes  
2 a Digital Signal (DS) – 1 extended superframe signal, such that each packet engine  
3 packet includes a DS1 frame of the DS1 extended superframe signal.

1 30. The machine-readable medium of claim 27, wherein the TDM signal includes  
2 a Digital Signal (DS) – 3 signal, such that each packet engine packet includes a  
3 subframe of the DS3 signal.

1 31. The machine-readable medium of claim 27, wherein the TDM signal includes  
2 an E1 signal.

1 32. The machine-readable medium of claim 27, wherein the network packets  
2 include Internet Protocol packets.

1 33. A machine-readable medium that provides instructions, which when executed  
2 by a machine, cause said machine to perform operations comprising:

3 receiving a first Time Division Multiplexing (TDM) signal that includes  
4 overhead data and payload data;

5 determining frame boundaries within the first TDM signal;

6 placing the first TDM signal into first packet engine packets based on the  
7 frame boundaries within the first TDM signal;

8 receiving a second TDM signal;

9 placing the second TDM signal into second packet engine packets,

10 independent of frame boundaries within the second TDM signal; and

11 generating network packets from the first and second packet engine packets

12 using a same packet processor.

1 34. The machine-readable medium of claim 33, wherein determining the frame  
2 boundaries with the first TDM signal includes generating frame alignment data for the  
3 first TDM signal.

1 35. The machine-readable medium of claim 34, wherein placing the first TDM  
2 signal into first packet engine packets includes placing the overhead data, the frame  
3 alignment data and the payload data into the first packet engine packets.

1 36. The machine-readable medium of claim 33, wherein the first and second TDM  
2 signals include a Digital Signal (DS) – 3 signal.

1 37. The machine-readable medium of claim 33, wherein the first and second TDM  
2 signals include a Digital Signal (DS) – 1 signal.

1 38. The machine-readable medium of claim 33, wherein the TDM signal includes  
2 a J1 signal.

39. The machine-readable medium of claim 33, wherein the TDM signal includes a J1 signal and a J2 signal.